

Remarks

The specification and claim 1 have been amended and new claims 68-70 have been added. Review and reconsideration in light of the amendments and the comments below are respectfully requested.

Applicant hereby confirms the provisional election made without traverse to prosecute the invention of Group IA, including claims 2, 6, 7, 10, 11 and 24.

The specification has been amended to change the title, as suggested in the Office action.

Claims 1, 2, 6, 7 and 24 are rejected as being anticipated by the Chung paper.

Accordingly, claim 1 has been amended to clarify that the diaphragm wafer and base wafer are joined after the sensor cavity is formed in the base wafer. In contrast, in the Chung paper any coupling of wafers (shown in Figs. 2(1) and 2(2) of the Chung paper) occurs prior to forming the sensor cavity (shown in Fig. 2(6)).

It is submitted that this amendment is not a narrowing amendment because claim 1, as originally filed, specified that the diaphragm wafer is coupled to the base wafer such that the diaphragm portion generally covers the sensor cavity. Thus, claim 1 as originally written implied that the sensor cavity must have already been formed in order for the sensor cavity to be covered.

Further, the diaphragm wafer of claim 1 is specified to include a diaphragm portion, a sacrificial portion, and an insulating layer disposed between the diaphragm portion and the sacrificial portion. In contrast, the only "coupling" step disclosed in the Chung paper is shown in Figs. 2(1) and 2(2). The Office action has construed the upper wafer in Fig. 2(1) as the claimed diaphragm portion (see Examiner's notation on Fig. 2(7)), and the lower wafer in Fig. 2(1) has been construed as the claimed base wafer (see Examiner's annotation on Fig. 2(6)). Thus, neither of the two "wafers" joined together in Figs. 2(1) and 2(2) of the Chung paper includes a diaphragm wafer including a diaphragm portion, a sacrificial portion, and an insulating layer disposed between the diaphragm portion and the sacrificial portion.

Thus, because the Chung paper does not disclose joining a base wafer and a diaphragm wafer after forming the sensor cavity, and does not disclose the claimed joined diaphragm wafer, it is submitted that claim 1 defines over the Chung paper.

New claim 68 corresponds somewhat to claim 6 recast in independent form with the exception that "semiconductor-on-insulator" wafers are specified instead of "silicon-on-insulator" wafers. In particular, claim 68 specifies that the base wafer and diaphragm wafer are both semiconductor-on-insulator wafers. In contrast, the Chung paper does not disclose two wafers, each wafer including two semiconductor layers separated by an insulating layer. Instead, each joined wafer of the Chung reference (shown in Fig. 2(1)) includes only a single silicon layer (with a third silicon layer being epitaxially grown in Fig. 2(5)).

At page 678 the Chung paper includes a discussion of first and second "SOI [silicon-on-insulator] layers." Thus, the Chung paper refers to SOI layers, but not SOI wafers. It is well known that a SOI wafer includes two layers of silicon. Thus, the Chung paper discloses only a single silicon-on-insulator wafer and it is submitted that claim 68 defines over the Chung reference.

Dependent claim 7 depends from claim 1 and specifies that the forming or locating step includes bombarding at least a portion of the diaphragm wafer with high energy atoms using implantation methods. The Office action takes the position that the Chung paper discloses the subject matter of claim 7. However, reference to bombarding a portion of the diaphragm reference with high energy atoms using implantation methods could not be found in the Chung paper.

Claim 10 is rejected as defining obvious subject matter over the Chung reference. In particular, the Office action takes the position that it would have been obvious to one of ordinary skill in the art to form the shape of the sensor cavity of the Chung reference as generally circular. However, the Chung reference discloses that the diaphragm is formed through traditional anisotropic wet etching. Due to the crystalline structure of the silicon wafer, traditional

anisotropic wet etching will not allow the creation of a circular diaphragm, as specified in claim 10.

Claim 11 specifies that the first forming step includes etching the sensor cavity using deep reactive ion etching. The Office action takes the position that the subject matter of claim 10 is obvious over the Chung reference in view of U.S. Pat. No. 4,530,734 to Klima. However, no reference or discussion of reaction ion etching or deep reactive ion etching could be found in the Klima reference. In particular, reactive ion etching and deep reactive ion etching have a well-defined meaning in the art, and the Klima reference does not disclose or mention reactive ion etching or deep reactive ion etching.

Furthermore, it is noted that the etching method disclosed in the Klima reference is not shown as being used in conjunction with silicon wafers, which are utilized in the Chung reference. Thus, it is submitted that one of ordinary skill in the art would not be motivated to use the teachings of the Klima reference in the process of the Chung paper, and that the Office action does not supply sufficient motivation for the proposed combination.

Claim 24 has been amended to specify that the diaphragm wafer is coupled to the base wafer such that the sensor cavity is sealed between and located between the diaphragm portion and the base wafer. In contrast, the sensor cavity of the Chung reference is not sealed between or located between the diaphragm portion and what has been construed as the base wafer.

Claim 62 is rejected as defining obvious subject matter over the Petersen paper in view of the Klima reference. The Office action acknowledges that the Petersen paper does not disclose the use of reactive ion etching to form a cavity. The Office action cites to the Klima reference as allegedly showing reactive ion etching and takes the position that one of ordinary skill in the art would use the etching method of the Klima reference in the process of the Petersen paper.

However, as noted above, the Klima reference does not disclose reactive ion etching. Furthermore, the etching method disclosed in the Klima reference is not shown in use with silicon substrates such as those disclosed in the Petersen paper. Thus, one of ordinary skill in the art would not be motivated to utilize the teachings of the Klima patent in the Petersen reference,

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and even if the references were to be combined, the subject matter of claims 62 and 63 would not be shown.

Applicant filed an Information Disclosure Statement on November 26, 2001, a copy of which is enclosed. A copy of the postcard indicating receipt of the IDS by the Office is also enclosed. However, applicant has not received an initialed copy of the citation sheet indicating consideration of the references, which is respectfully requested. The Examiner is invited to contact the undersigned should copies of any of the cited references (specifically, the cited papers) be required.

In addition, it is noted that the Office action included a copy of Japanese Patent JP 59-188176 (with an English abstract). However, this reference was not listed on the PTO Form 892 (Notice of References Cited). Issuance of a supplemental PTO Form 892 citing this Japanese patent is requested.

Thus, in sum it is submitted that the application is in a condition for allowance, and a formal notice thereof is respectfully requested. The applicant(s) hereby authorizes the Commissioner under 37 C.F.R. §1.136(a)(3) to treat any paper that is filed in this application which requires an extension of time as incorporating a request for such an extension. The Commissioner is authorized to charge any additional fees required by this paper or to credit any overpayment to Deposit Account No. 20-0809. In the event that the examiner wishes to discuss any aspect of this response, please contact the undersigned at the telephone number indicated below.

Respectfully submitted,



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